# Review of Noise Analysis of Proposed Flight Procedure Changes at BWI Marshall

Presented by MDOT MAA and HMMH
June 15, 2021

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

# Agenda

- Purpose of presentation
- Review of April 2018 FAA proposed procedure changes
- Noise analysis of proposed procedure changes
  - Includes both procedure changes proposed by the FAA in April 2018 FAA and Technical Committee proposed procedure changes from November 2019

# Purpose of Tonight's Meeting

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# Purpose of Tonight's Meeting

- Provide overview of FAA's proposed changes to BWI Marshall flight procedures
- Review noise analysis that includes both FAA's proposed procedure changes and procedure changes developed and supported by the Roundtable, Technical Committee, MDOT MAA, and Industry

- Presented at the November 2019 Roundtable meeting

# Abbreviated Timeline of Procedure Change/Roundtable Technical Committee Process

- **March 2015:** FAA completed implementation of DC Metroplex at BWI Marshall, communities voice concerns regarding flight path changes
- **February 2016:** FAA further modifies departure procedure (TERPZ) for Runways 28 and 15R
- **March 2017:** DC Metroplex BWI Community Roundtable formed to address community concerns regarding flight path changes
- **August 2017 – April 2018:** FAA convenes PBN Working Group to evaluate modifying BWI Marshall procedures. FAA presents proposed flight procedures (mainly departures) from PBN Working Group to Roundtable. Roundtable provided comments via letter to the FAA.
- **December 2018 – January 2019:** MDOT MAA presents noise analysis of FAA proposed procedure changes from April 2018. Roundtable sends FAA letter assessing proposed procedure changes
- **February 2019 – September 2019:** Roundtable Technical Committee meets with MDOT MAA and industry to explore and finalize additional flight procedure changes (arrivals)
- **October 2019:** Roundtable Technical Committee presents "first look" at proposed flight procedure changes to full Roundtable
- **December 2019:** Roundtable submits proposed flight procedure changes package to FAA
- **October 2020:** Discussion with FAA, MDOT MAA, and Roundtable Technical Committee
- **April 2021:** Discussion with FAA and MDOT MAA

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# Review of April 2018 FAA Proposed Procedure Changes

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# April 2018 FAA Proposed Procedure Summary

- FAA presented proposed changes to BWI Marshall arrival and departure procedures to the BWI Roundtable on April 24, 2018
  - Departure Changes:
    - Modification of Runway 15R and 28 westbound departures to return aircraft flight paths closer to pre-Metroplex historical locations and better distribute departures
    - Adjustments to Runway 28 southbound departures to meet FAA design criteria
    - "Climb Via" capability added to all procedures
  - Arrival changes:
    - Adjustment of downwind leg for Runway 28 for arrivals from the northeast and minor changes in high-altitude En-route airspace to address design criteria issues
    - Adjustment of the base leg for Runway 28 for arrivals from the southeast and minor changes in high-altitude En-route airspace to address design criteria issues
- Note: The full FAA presentation from April 24, 2018 can be found at: https://maacommunityrelations.com/_media/client/anznoiseupdate/2018/BWI_Overview_CapitalProject_FINAL_20180419.pdf

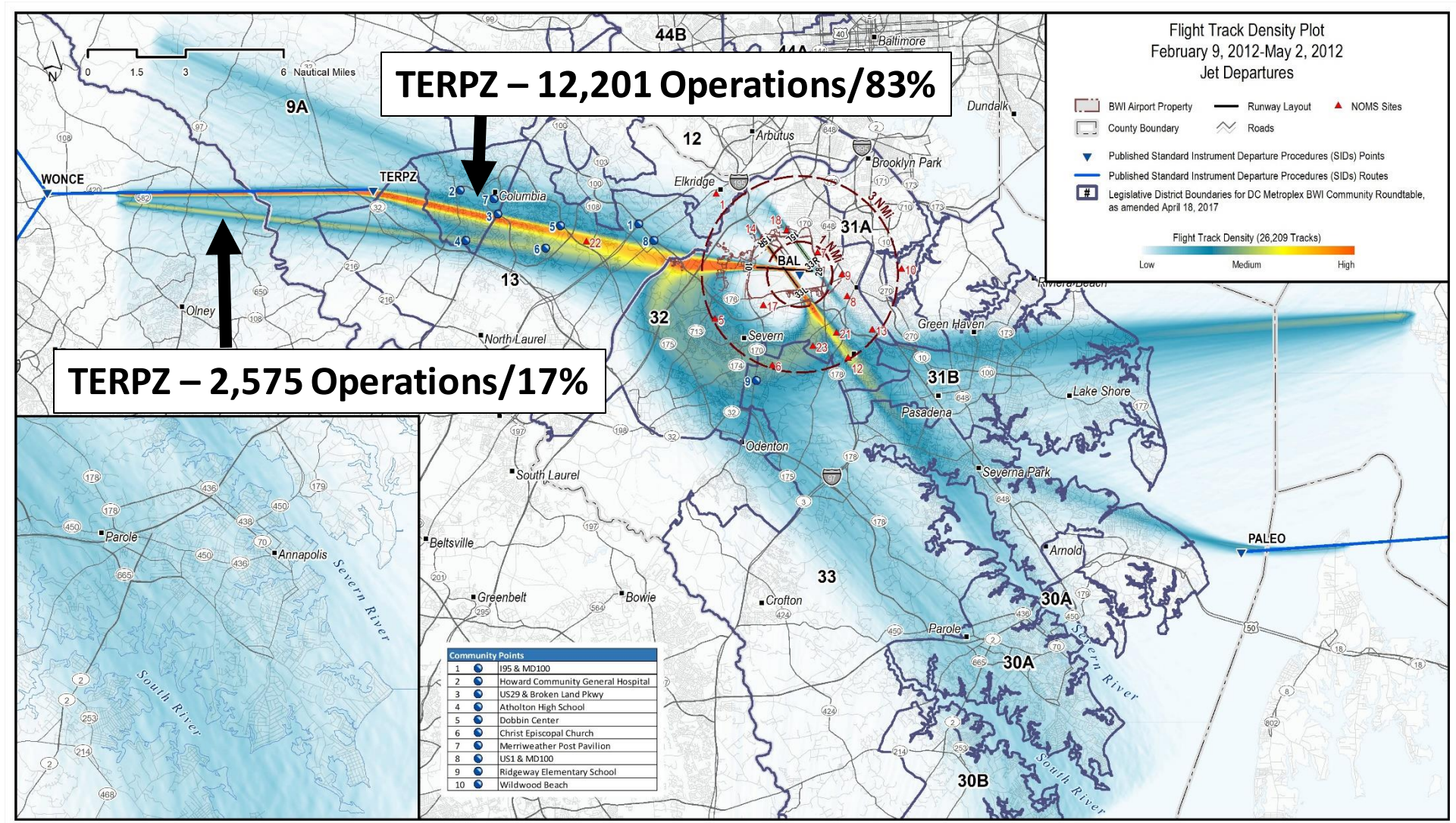
# April 2018 FAA Proposed Procedure Summary

- The MDOT MAA prepared a noise and technical analysis of the FAA proposed changes at the request of the Roundtable and presented the results at the December 4, 2018 Roundtable meeting
  - Note: The full MDOT MAA presentation from December 4, 2018 can be found at: https://maacommunityrelations.com/_media/client/anznoiseupdate/2018/MDOT_MAA_BWI_Marshall_April_24_FAA_Proposed_Procedure_Analysis_20181204.pdf
- The following slides present graphics originally prepared and presented by MDOT MAA at the December 4, 2018 Roundtable meeting
  - Each graphic depicts flight track of Jet aircraft from three data samples: 2012, 2017, and 2017 proposed (simulated) to fly the FAA's proposed procedures
  - Red ("warmer") colors indicate areas of more tracks/concentration, Blue ("cooler") colors indicate areas of less tracks/concentration
- The technical analysis of the proposed procedure changes developed by the Technical Committee **supplements and include** these FAA proposed departure and arrival changes
  - Discussion and presentation of the Technical Committee changes provided at the November 2019 and April 2021 meetings

# FAA Proposed Procedure Summary - Departures

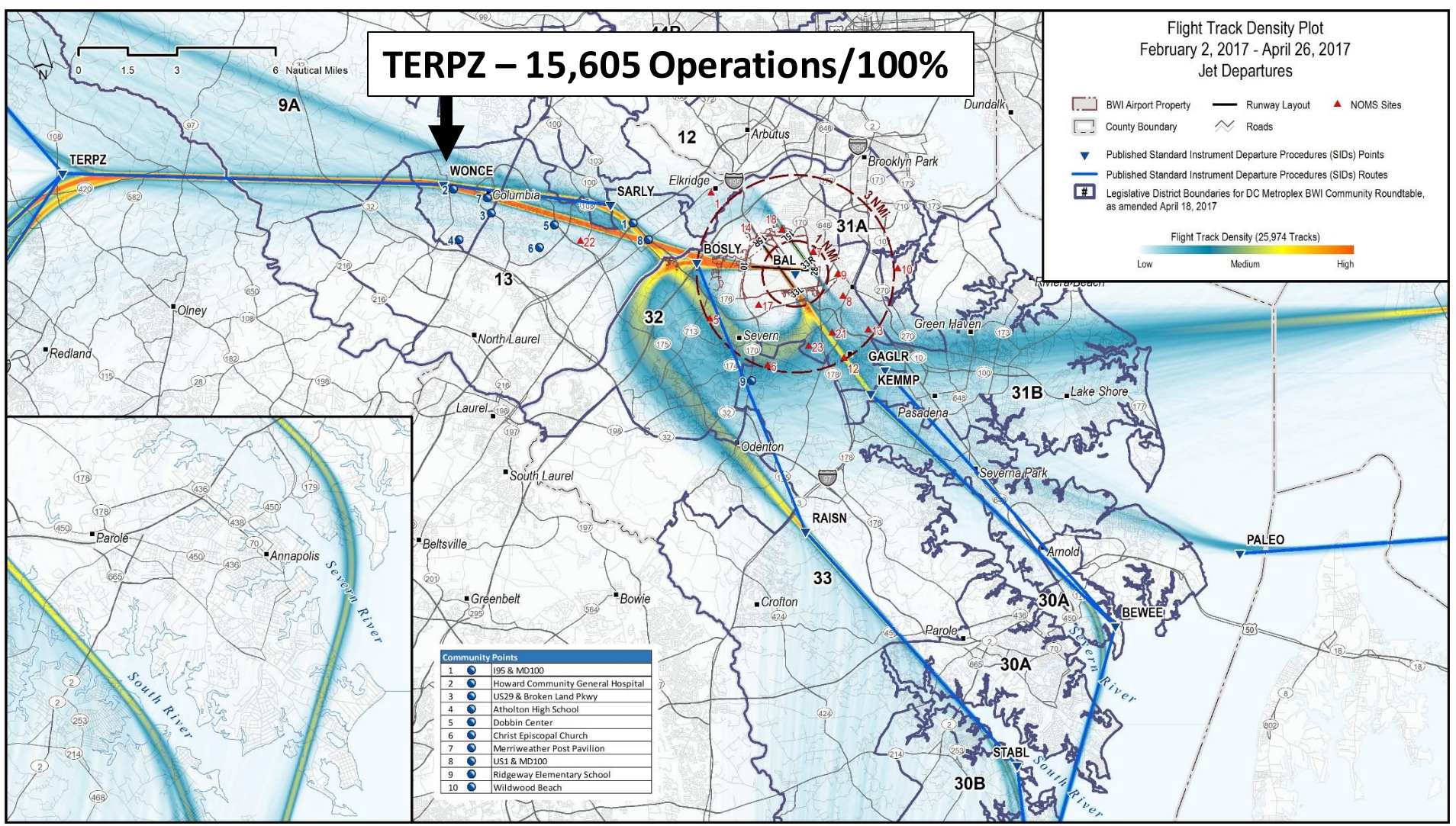
- Departure Changes
  - Modification of TERPZ procedure (westbound departures) to return aircraft flight paths closer to pre-Metroplex historical locations
  - Creation of new LINSE procedure (westbound departures) to better distribute departures over pre-Metroplex historical locations
  - Adjustments to CONLE and FIXET procedures (southbound departures) to meet FAA design criteria
  - Shifting of low altitude overflights (T Routes) to de-conflict from departures
  - “Climb Via” capability added to all procedures

# 2012 Jet Departures – Actual



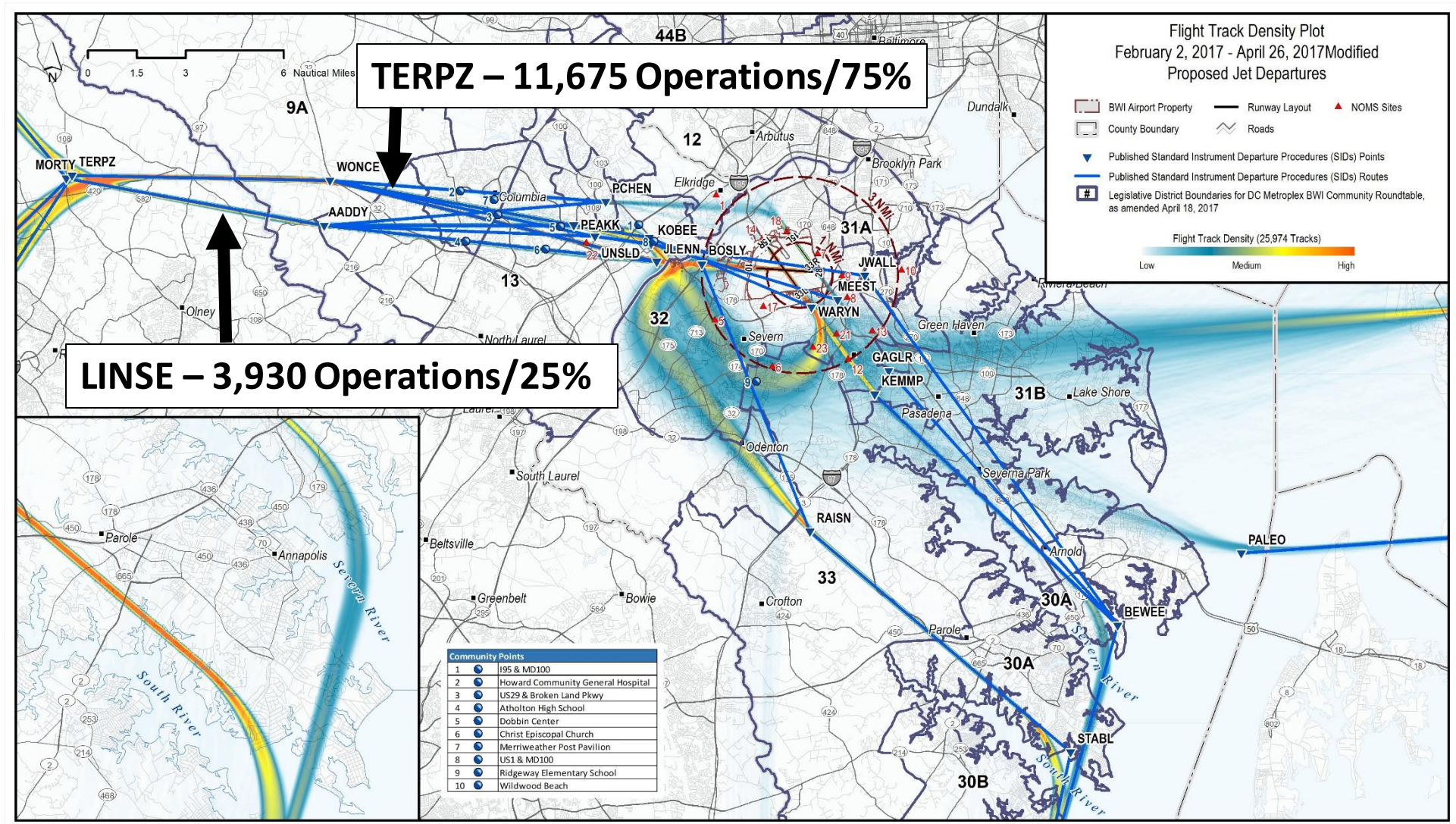

Note: Previously presented by MDOT MAA on December 4, 2018

# 2017 Jet Departures – Actual




Note: Previously presented by MDOT MAA on December 4, 2018

# 2017 Jet Departures –Proposed (Simulated)




Note: Previously presented by MDOT MAA on December 4, 2018

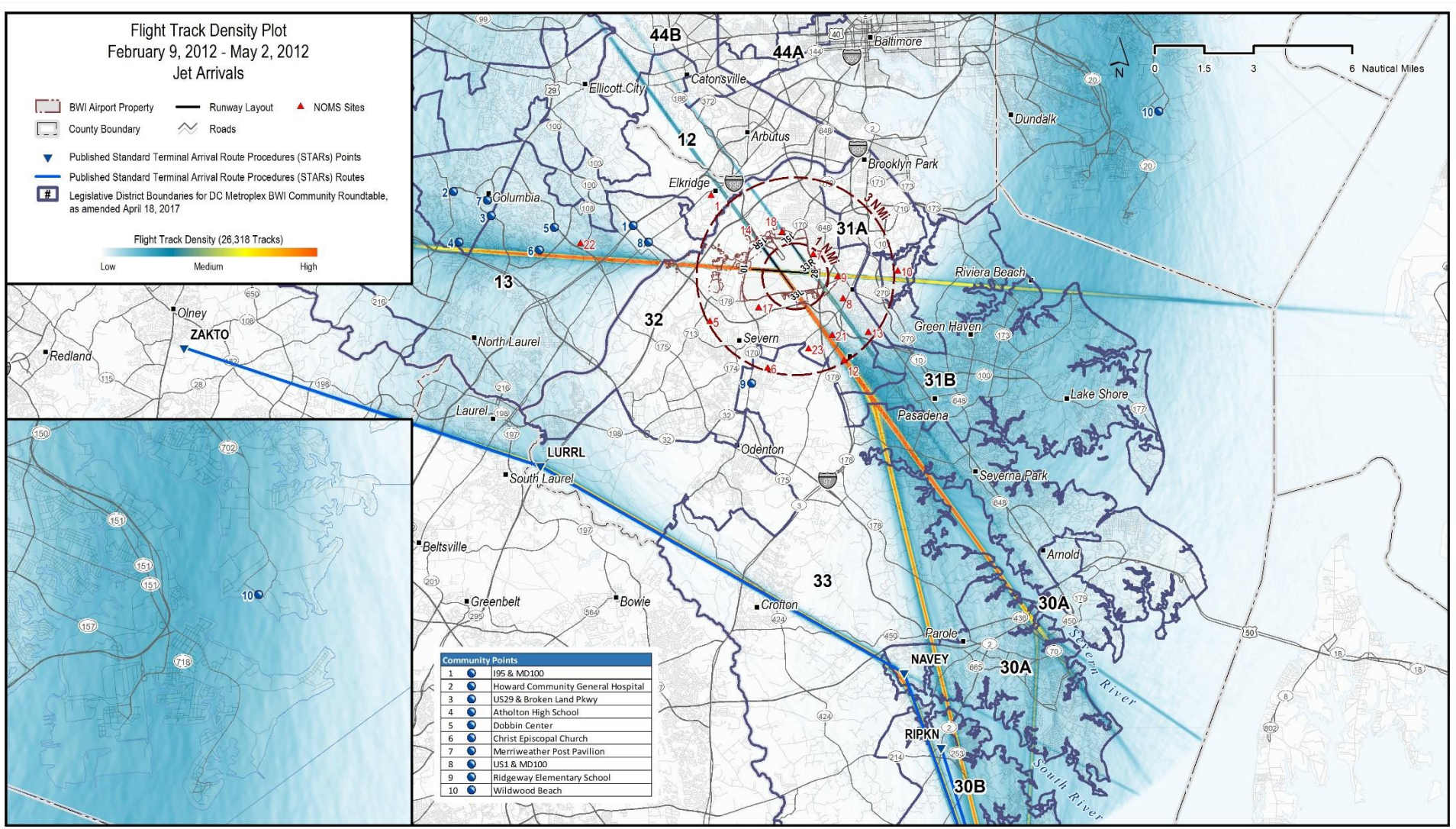
# All Jet Departures – Flight Track Analysis Summary

- Proposed FAA procedures for Runways 15R and 28 may:
  - Shift Runway 15R initial Jet departure turns southeast of 2012 and 2017 turn locations
  - Increase dispersion of Runway 15R initial Jet departure turns relative to 2017, but will not return dispersion to 2012 levels
  - Shift flight paths for both runways closer to 2012 historical locations to the west and south of Elkridge and Columbia
  - Shift Runway 28 CONLE departures over the Annapolis peninsula at altitudes of 8,000 – 9,000 feet MSL
- Minor changes to aircraft altitude profiles
- Proposed FAA procedures for other Runways may:
  - Marginally increase the concentration of Runway 33R Jet departures

# FAA Proposed Procedure Summary - Arrivals

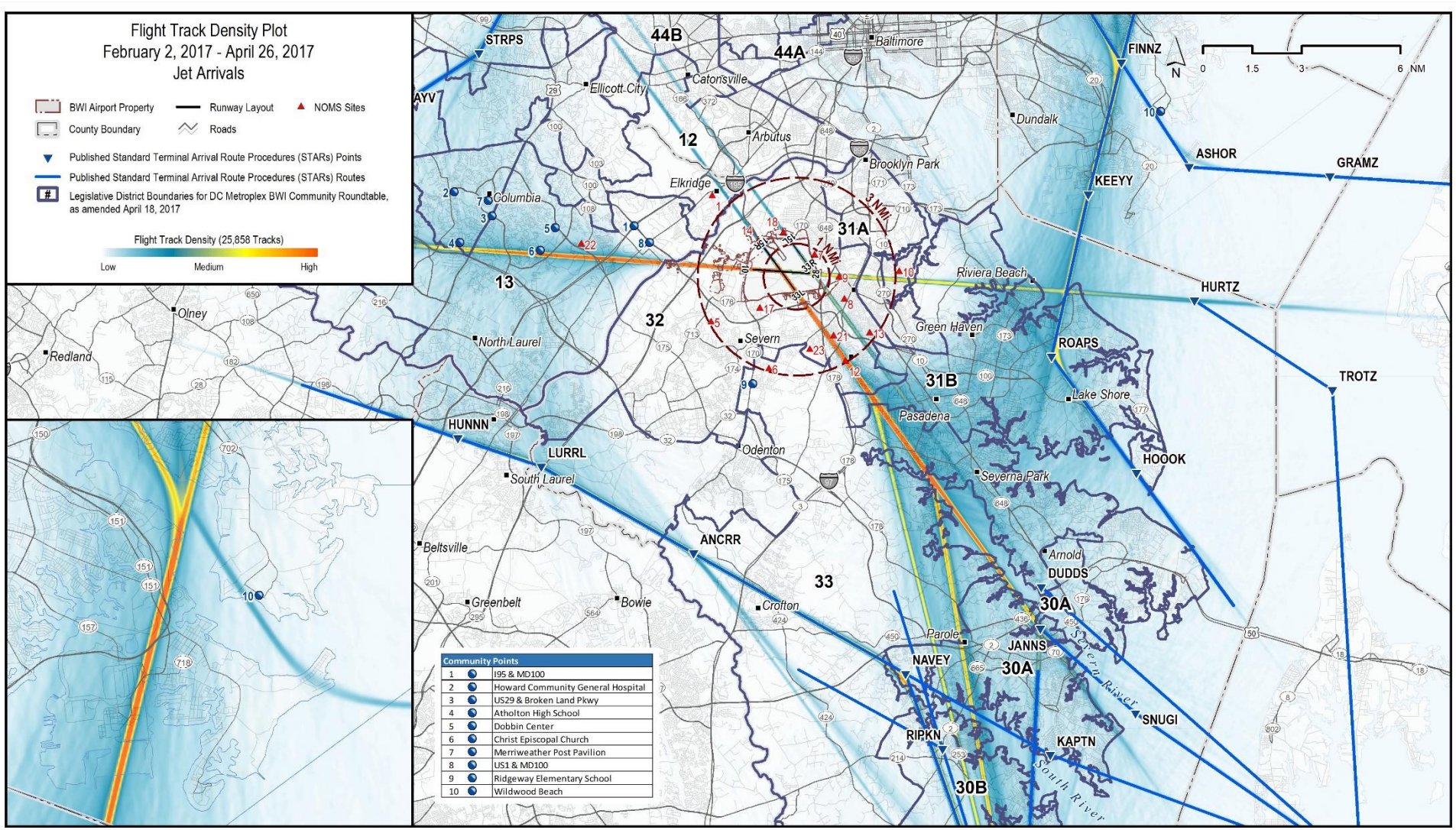
- Arrival Changes
  - Modification of ANTHM and TRISH procedures (arrivals from west and north) to adjust downwind leg for Runway 28 and address design criteria issues
  - Modification of MIIDY procedure (arrivals from southeast) to adjust base leg for Runway 28 and address design criteria issues

# 2012 Jet Arrivals – Actual



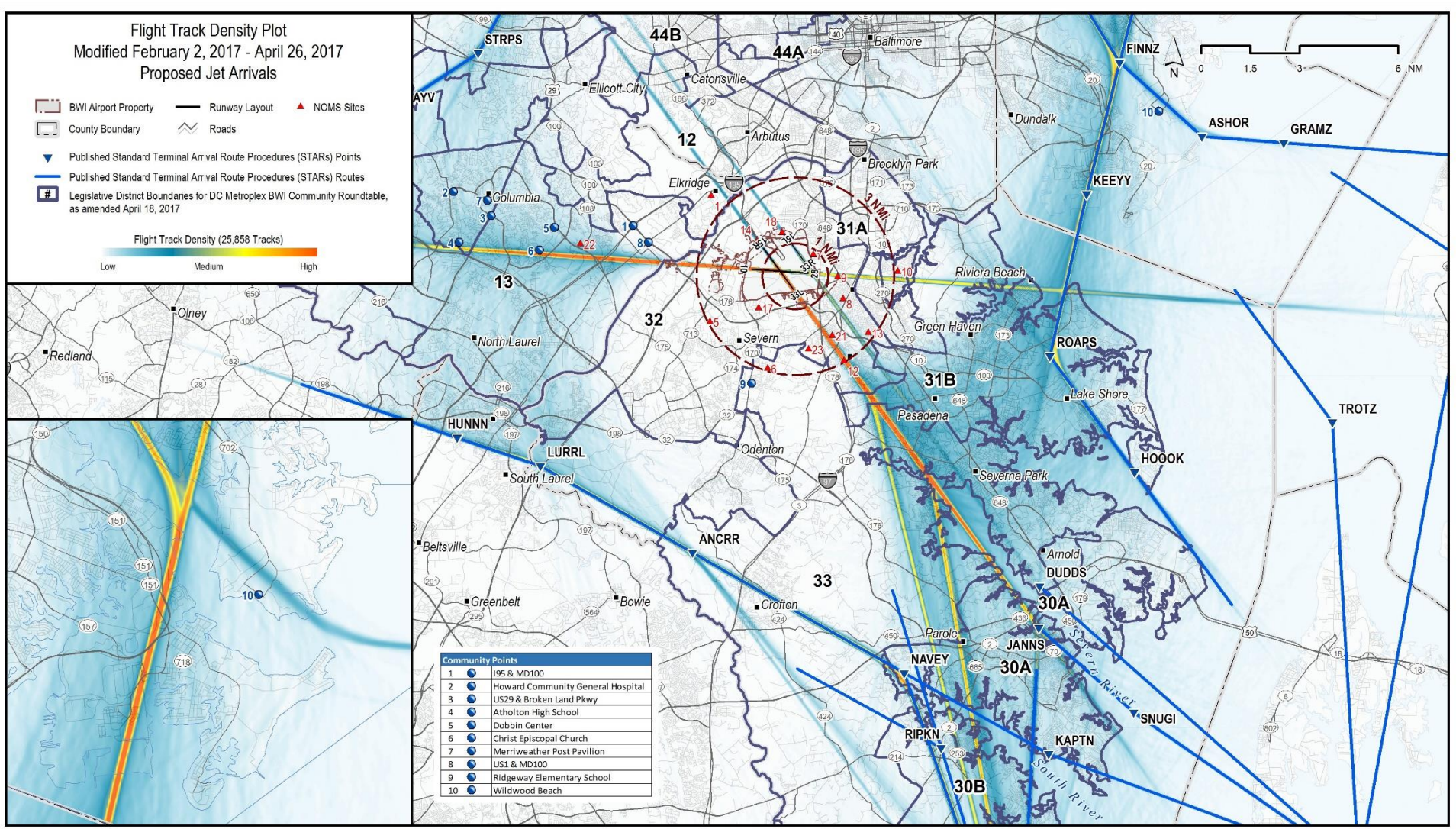

Note: Previously presented by MDOT MAA on December 4, 2018

# 2017 Jet Arrivals – Actual




Note: Previously presented by MDOT MAA on December 4, 2018

# 2017 Jet Arrivals – Proposed (Simulated)




Note: Previously presented by MDOT MAA on December 4, 2018

# All Jet Arrivals – Flight Track Analysis Summary

- Proposed FAA procedures for Runway 28 may shift the flight paths of arrivals to the north as aircraft turn to the downwind leg near Wildwood Beach
- No other anticipated notable flight path or altitude changes

# Noise Analysis of FAA (April 2018) and Technical Committee (November 2019) Proposed Procedure Changes

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# Noise Analysis – Overview

- Developed noise modeling inputs from radar flight track data samples used in flight track analysis for 2012, 2018-2019, and 2018-2019 proposed (simulated) operations flying the April 2018 FAA and Technical Committee's proposed procedure changes
- Noise analysis includes **all operations** from each data sample
  - Arrivals and departures
  - All aircraft types (Jet, Piston/Turbine Propeller, and Helicopters)

# Noise Analysis – Overview

- Adjusted operations to ensure arrival and departure operations are equal, and then scaled to match FAA recorded operations at BWI Marshall from FAA Air Traffic Activity Data System (ATADS) based on Tower Category
  - Modeled 2012 (123 days) operations: 89,719
  - Modeled 2018-2019 (120 days) operations: 85,862
- 2018-2019 operations proposed (simulated) to fly April 2018 FAA and Roundtable proposed procedures utilized same inputs as baseline 2018-2019 data sample with the exception of changes to aircraft flight tracks
- Fed inputs into Aviation Environmental Design Tool (AEDT) Version 2d SP2
- Generated noise results
  - Day-Night Average Sound Level (DNL)
  - Contours, uniform grid, and US Census Block centroids
  - Population counts from 2010 US Census and 2016 American Community Survey (ACS) 5-Year Estimates

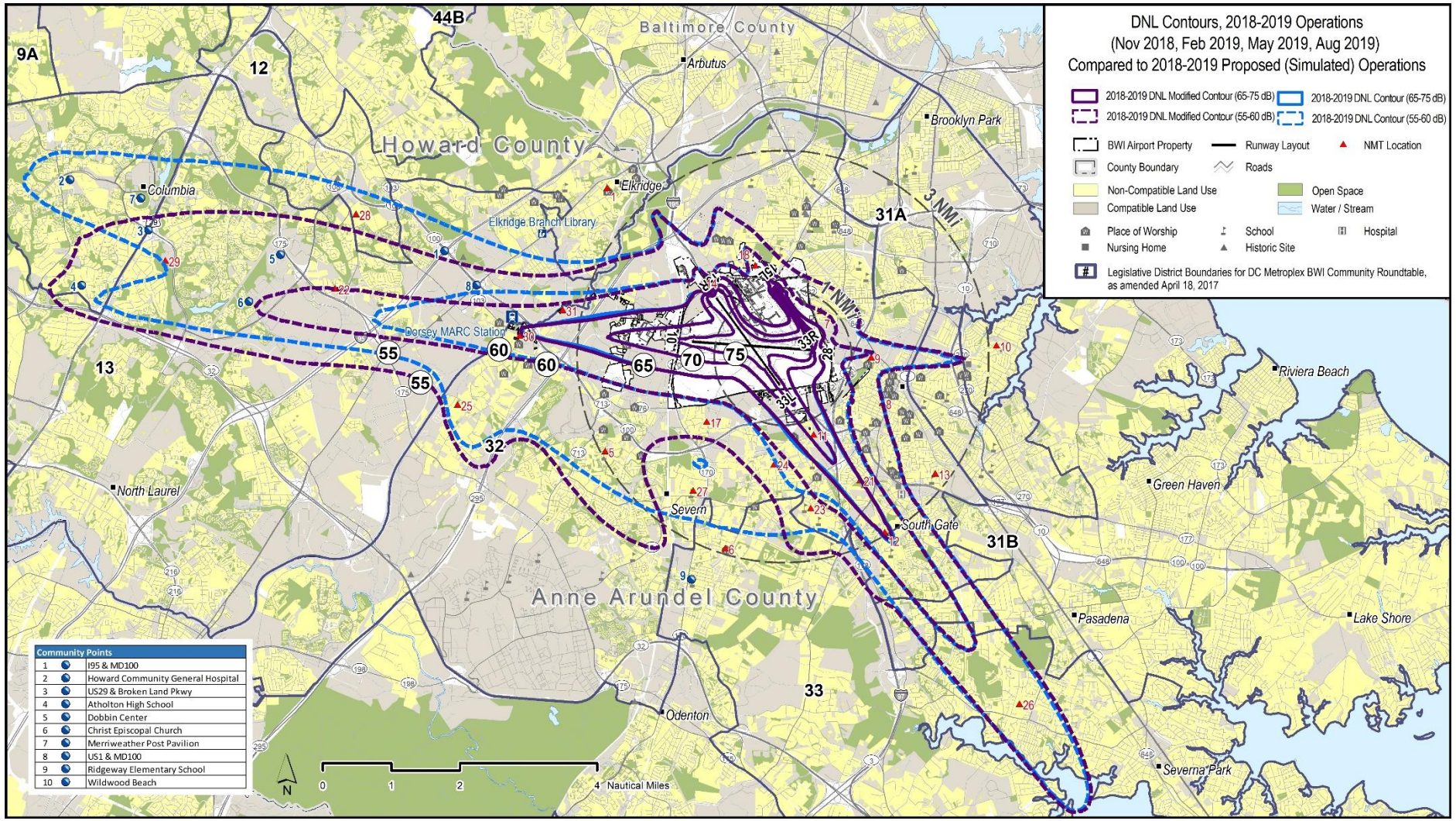
# Modeled DNL Contours – 2018-2019 Proposed (Simulated) Compared to 2018-2019

## 2010 US Census

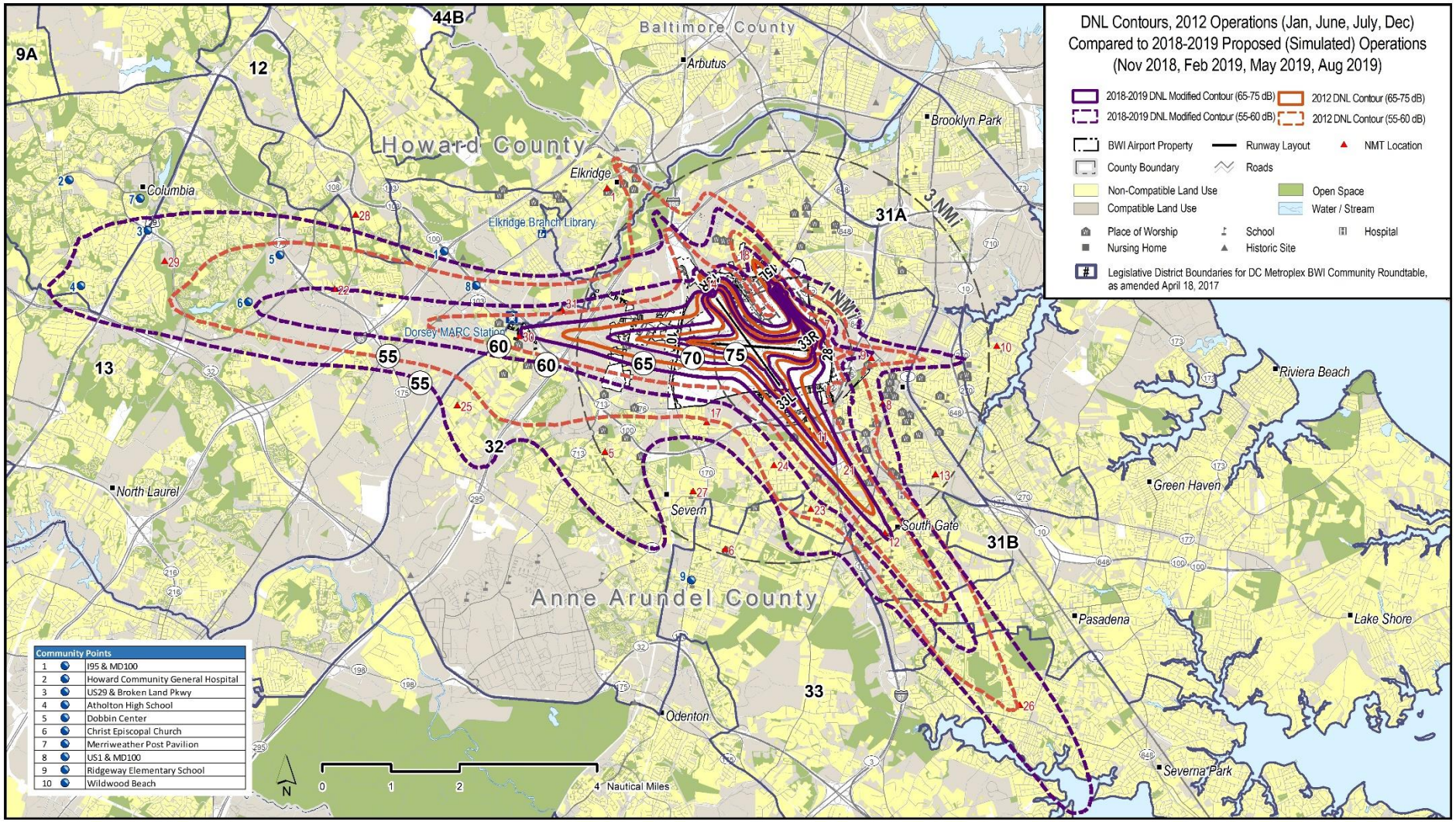
| Contour Range | Population Difference | Households Difference |
|---|---|---|
| 55-60 dB | -22,277 | -10,480 |
| 60-65 dB | 2,628 | 1,140 |
| 65-70 dB | 28 | 9 |
| 70-75 dB | 1 | 1 |
| 75+ dB | 0 | 0 |
| Total | -19,620 | -9,330 |

## 2016 ACS 5-Year Estimates

| Contour Range | Population Difference | Households Difference |
|---|---|---|
| 55-60 dB | -24,053 | -10,258 |
| 60-65 dB | 3,147 | 1,366 |
| 65-70 dB | -38 | -29 |
| 70-75 dB | 17 | 7 |
| 75+ dB | 0 | 0 |
| Total | -20,927 | -8,914 |



# Modeled DNL Contours – 2018-2019 Proposed (Simulated) Compared to 2012

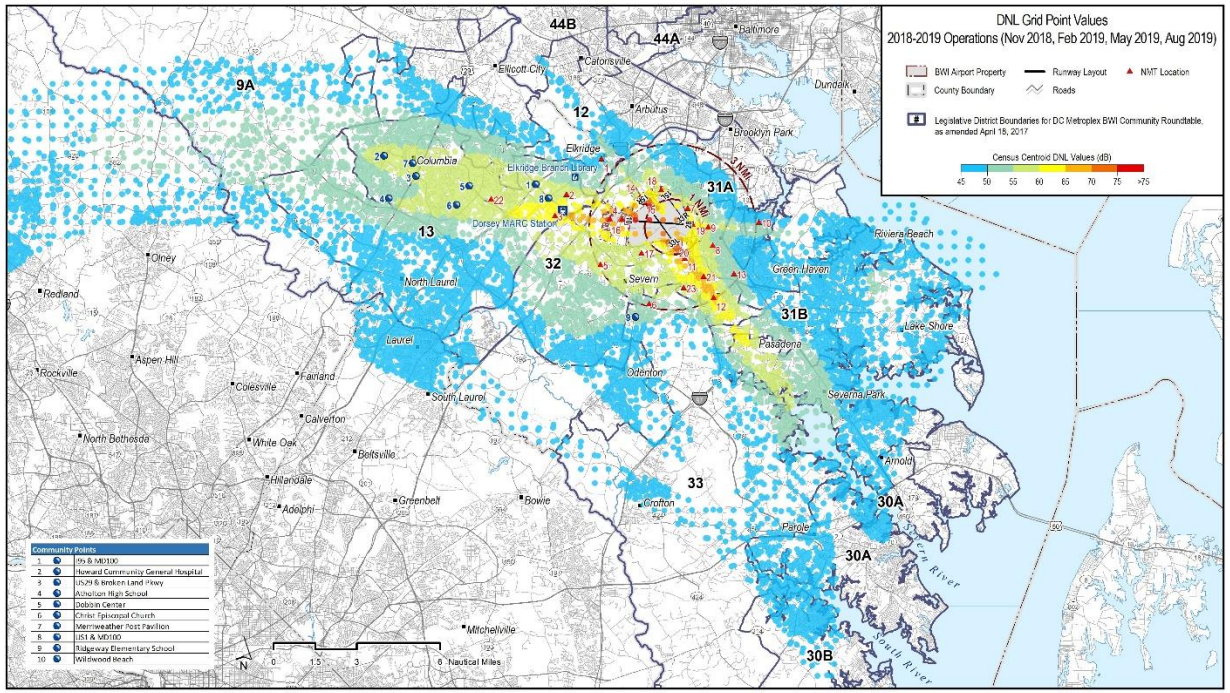


# Noise Analysis – Modeled DNL Contour Summary

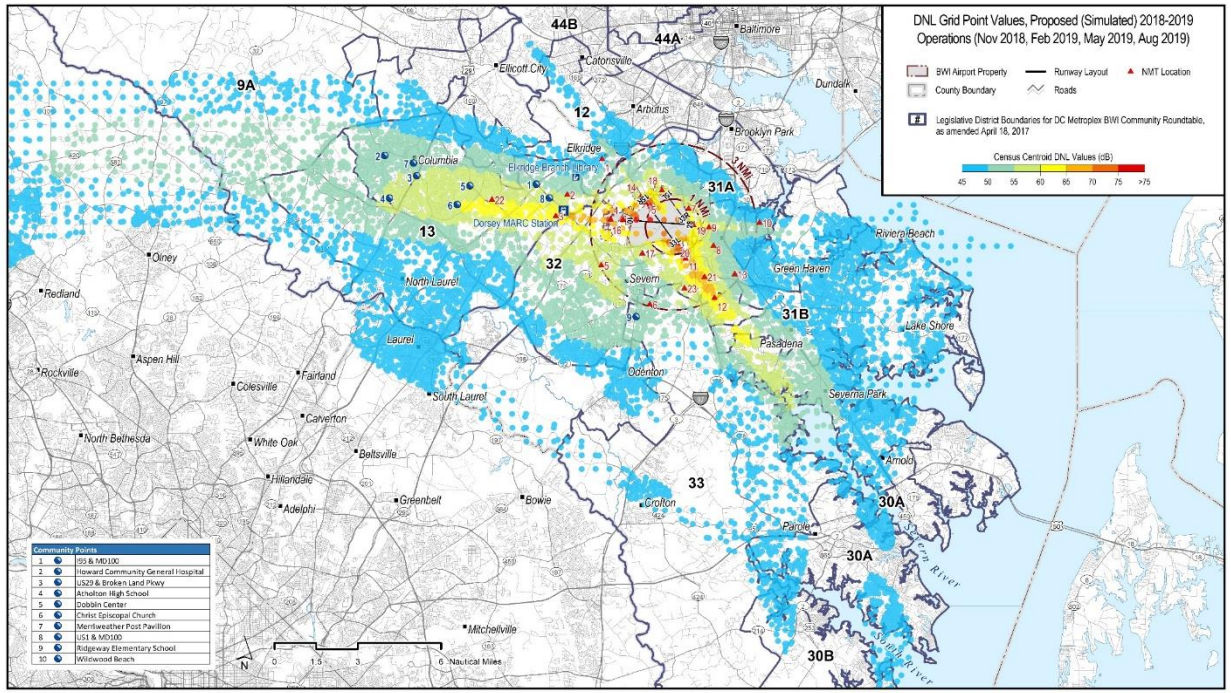
- Proposed FAA and Roundtable Technical Committee proposed procedures may:
  - Slightly change the 65 dB DNL and greater contours
    - Shift the 65 dB DNL and greater contours west of the airport to the south due to changes in Runway 28 departures
    - Shift the 65 dB DNL and greater contours southeast of the airport to the northeast due to changes in Runway 15R departures and 33L arrivals
  - Shift the 55 and 60 dB DNL contours west of the airport associated with Runway 28 departures and Runway 10 arrivals further to the south away from Columbia and Elkridge towards the historical location of 55 and 60 dB DNL contours in 2012
  - Shift the 55 and 60 dB DNL contours southeast of the airport associated with Runway 15R departures and Runway 33L arrivals further to the south and west away from Elmhurst towards Severn

# Modeled DNL Grid Points – Comparison

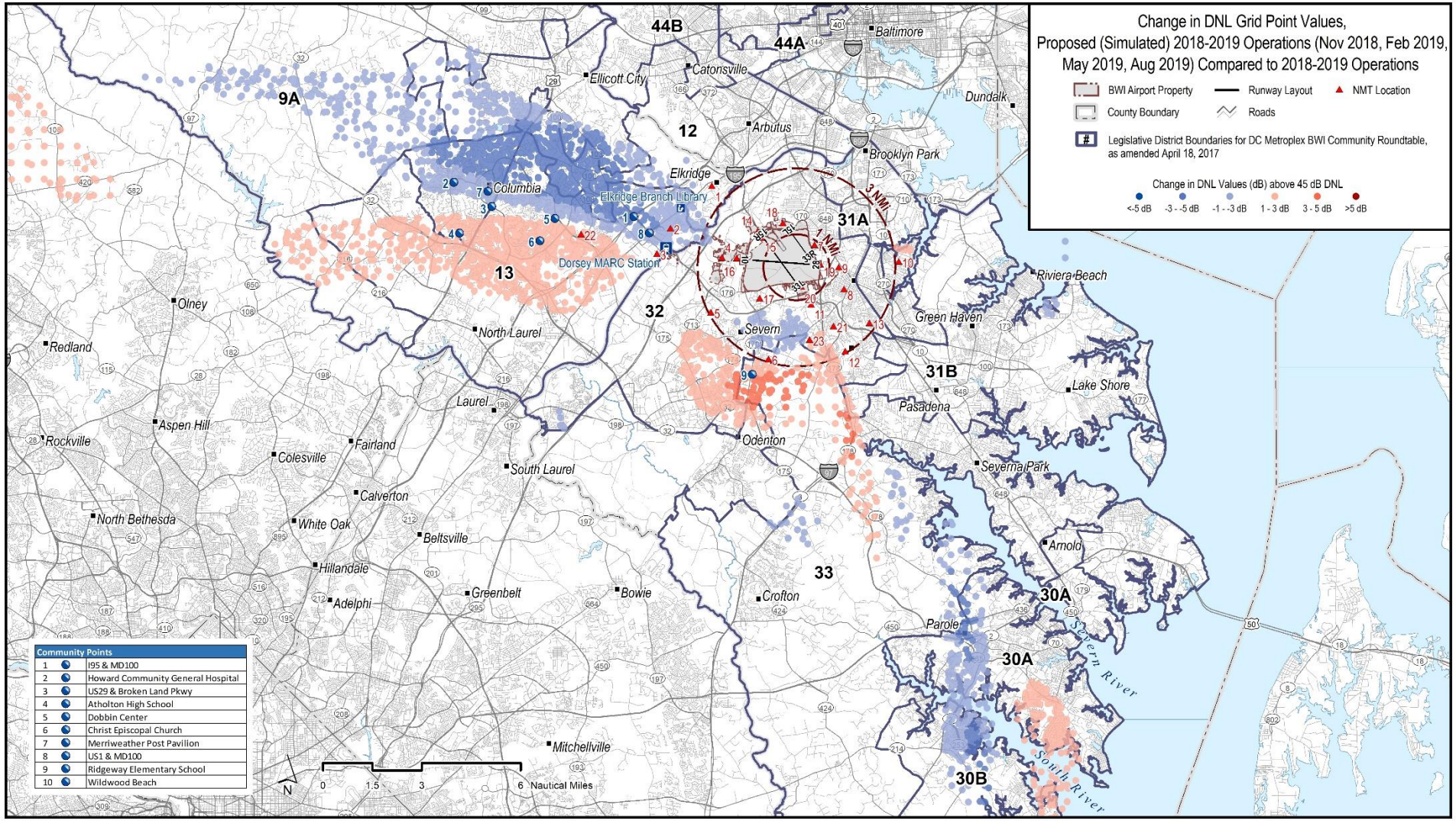
## 2018-2019




## 2018-2019 Proposed (Simulated)



# Modeled DNL Grid Points – 2018-2019 Proposed (Simulated) Compared to 2018-2019



# Noise Analysis – Summary

- None of the observed noise increases or decreases meet the FAA criteria for reportable changes defined under FAA Order 1050.1F, "Environmental Impacts: Policies and Procedures"
  - (+/-) 1.5 dB change within 65 dB DNL
  - (+/-) 3 dB change within 60 dB DNL
  - (+/-) 5 dB change within 45 dB DNL
- Proposed FAA departure procedures may:
  - Slightly decrease noise over and north of Columbia, and increase noise south of Columbia over Guilford due to shifting south of Runway 15R and 28 westbound departures
  - Slightly decrease noise over northern areas of Severn and Elmhurst, and increase noise in the southern areas of Severn approaching Odenton due to shifting south of the westbound Runway 15R departure turn
  - Slightly increase noise over the Annapolis peninsula associated with southbound Runway 28 departure changes. However, this increase may not be realized if the FAA considers the Roundtables request not to move forward with these changes

# Noise Analysis – Summary

- Proposed Roundtable Technical Committee arrival and approach procedures may:
  - Slightly decrease noise west of Columbia and over Elkridge due to shifting to the east of some Runway 10 arrivals and continuous descents for Runway 15R arrivals
  - Slightly decrease noise along a corridor from south to north from the South River to the Severn River west of Annapolis due to continuous descents for Runway 33L arrivals
  - Slightly increase noise along a corridor from south to north from Crownsville to Millersville along Interstate 97 due to the creation of an RNP approach for Runway 33L arrivals from the RAVNN to WP 21 navigational points

# Questions and Discussion

# Backup Slides

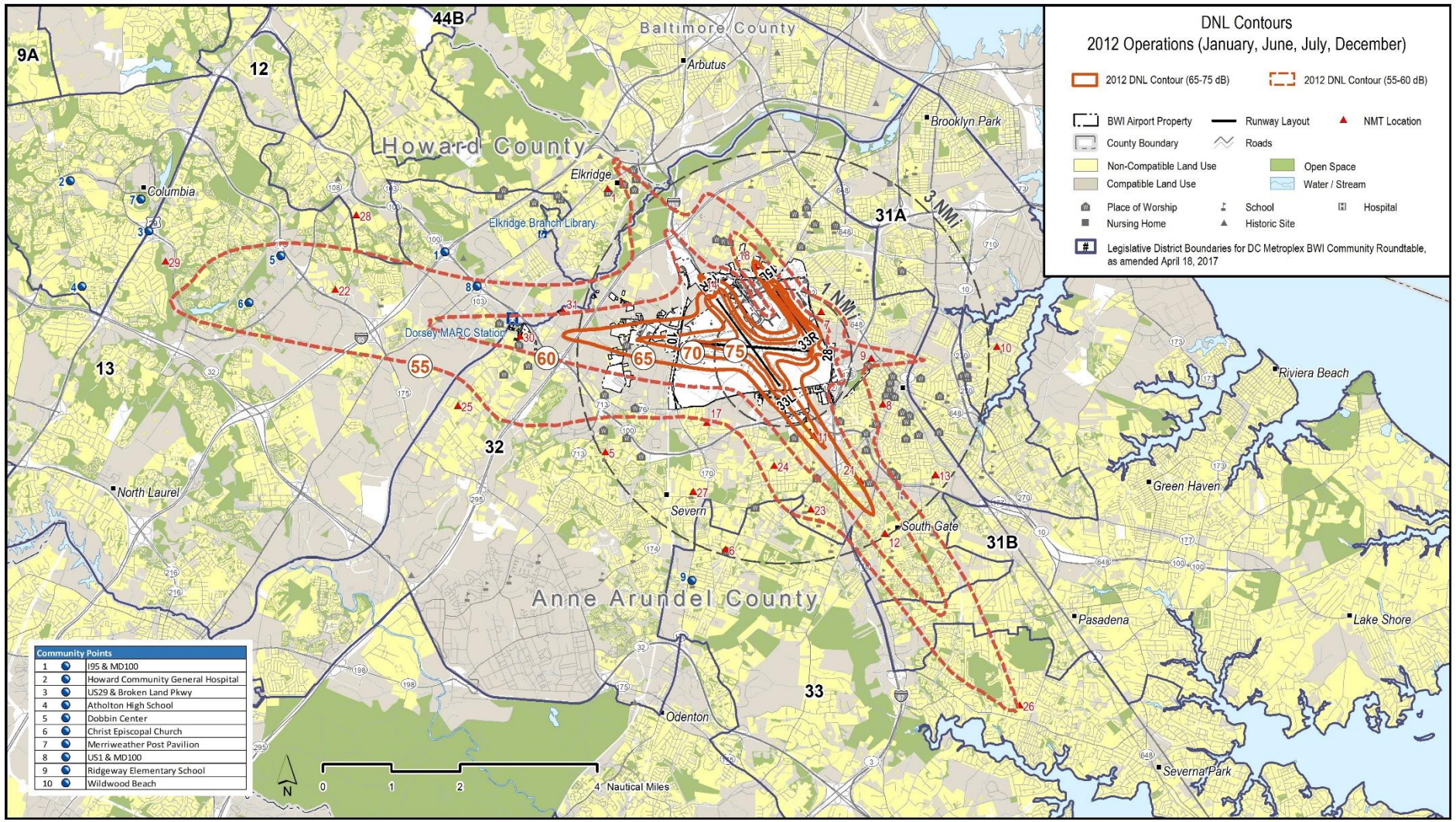
# Modeled DNL Contours - 2012

## 2010 US Census

| Contour Range | Population | Households |
|---|---|---|
| 55-60 dB | 44,704 | 17,778 |
| 60-65 dB | 9,805 | 4,034 |
| 65-70 dB | 1,041 | 420 |
| 70-75 dB | 25 | 8 |
| 75+ dB | 0 | 0 |
| Total | **55,575** | **22,240** |

## 2016 ACS 5-Year Estimates

| Contour Range | Population | Households |
|---|---|---|
| 55-60 dB | 52,204 | 20,675 |
| 60-65 dB | 10,054 | 4,378 |
| 65-70 dB | 2,162 | 820 |
| 70-75 dB | 191 | 74 |
| 75+ dB | 7 | 2 |
| Total | **64,618** | **25,949** |



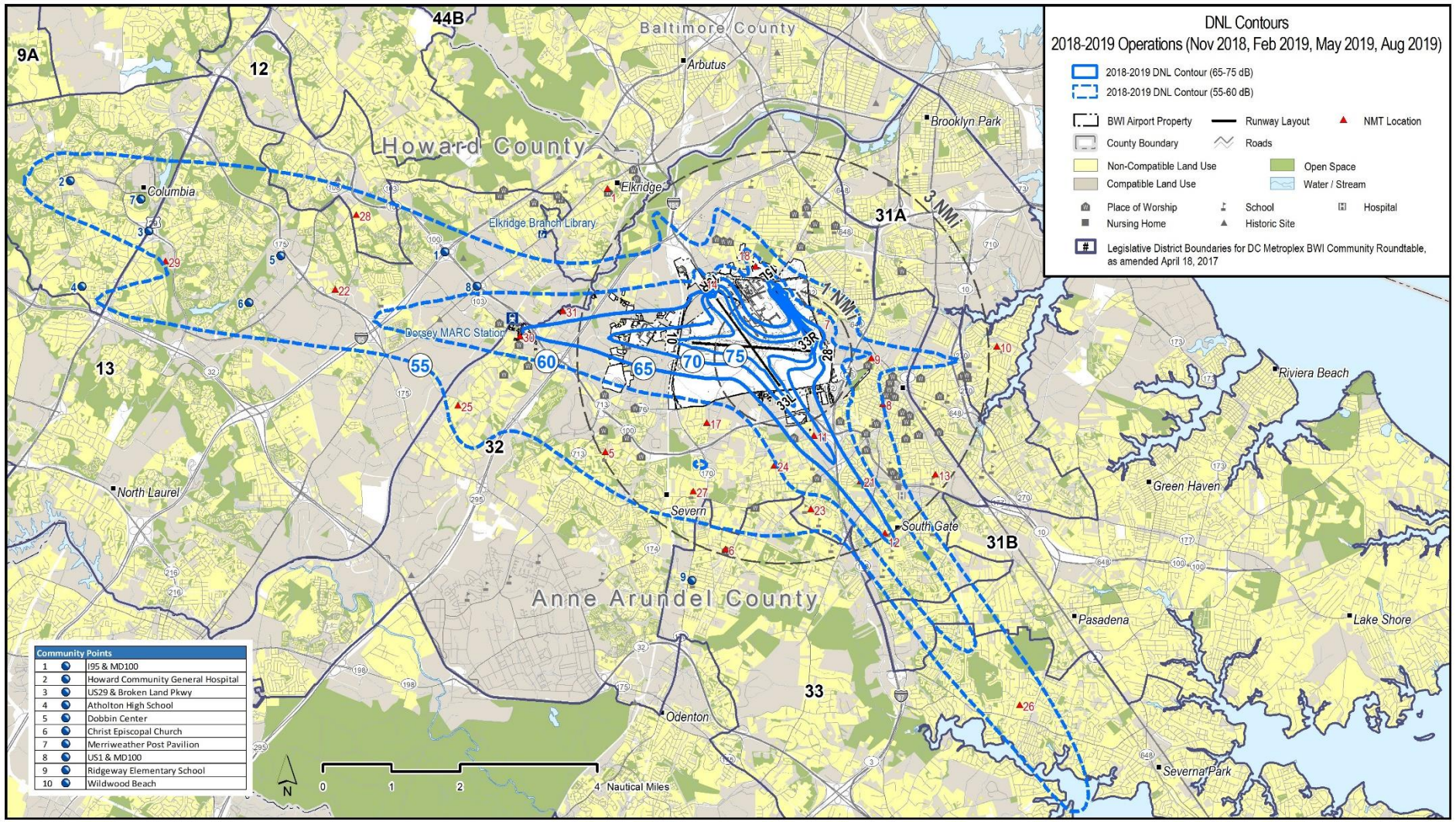
# Modeled DNL Contours – 2018-2019

## 2010 US Census

| Contour Range | Population | Households |
|---|---|---|
| **55-60 dB** | 102,133 | 41,413 |
| **60-65 dB** | 16,273 | 6,566 |
| **65-70 dB** | 2,496 | 1,019 |
| **70-75 dB** | 60 | 22 |
| **75+ dB** | 0 | 0 |
| **Total** | **120,962** | **49,020** |

## 2016 ACS 5-Year Estimates

| Contour Range | Population | Households |
|---|---|---|
| **55-60 dB** | 111,668 | 44,396 |
| **60-65 dB** | 16,531 | 6,709 |
| **65-70 dB** | 3,692 | 1,583 |
| **70-75 dB** | 410 | 159 |
| **75+ dB** | 18 | 7 |
| **Total** | **132,319** | **52,854** |



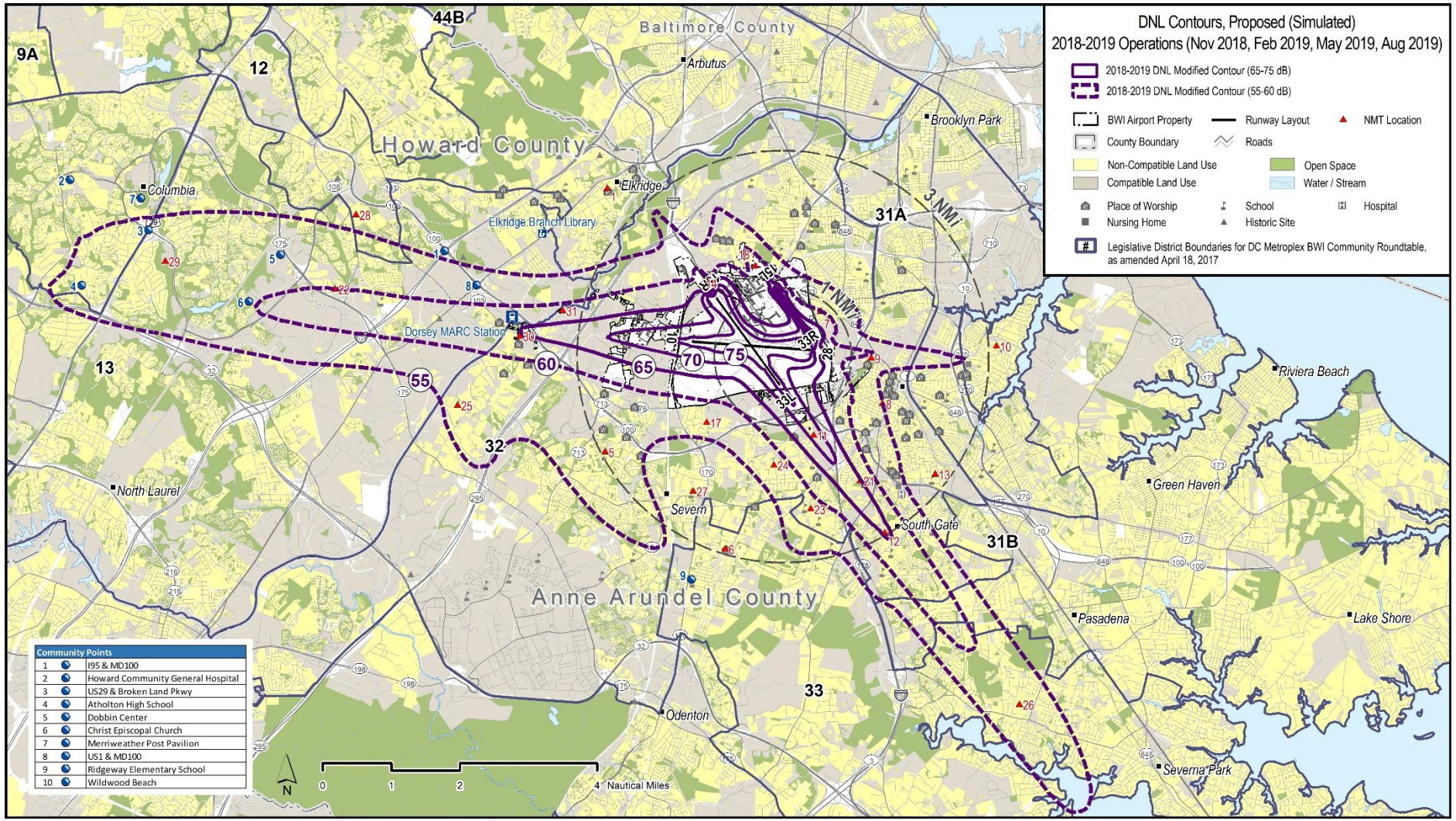
# Modeled DNL Contours – 2018-2019 Proposed (Simulated)

## 2010 US Census

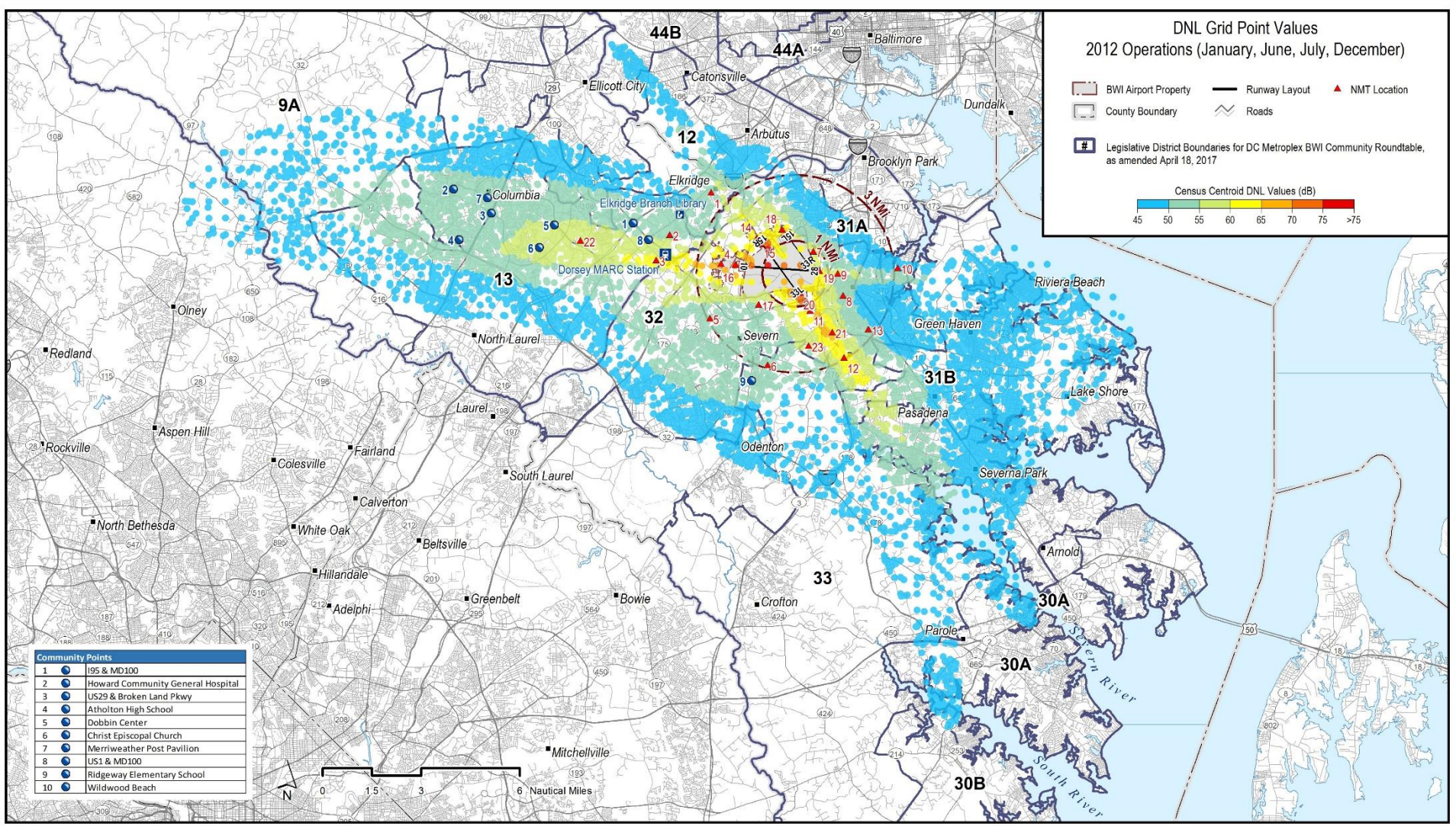
| Contour Range | Population | Households |
|---|---|---|
| **55-60 dB** | 79,856 | 30,933 |
| **60-65 dB** | 18,901 | 7,706 |
| **65-70 dB** | 2,524 | 1,028 |
| **70-75 dB** | 61 | 23 |
| **75+ dB** | 0 | 0 |
| **Total** | **101,342** | **39,690** |

## 2016 ACS 5-Year Estimates

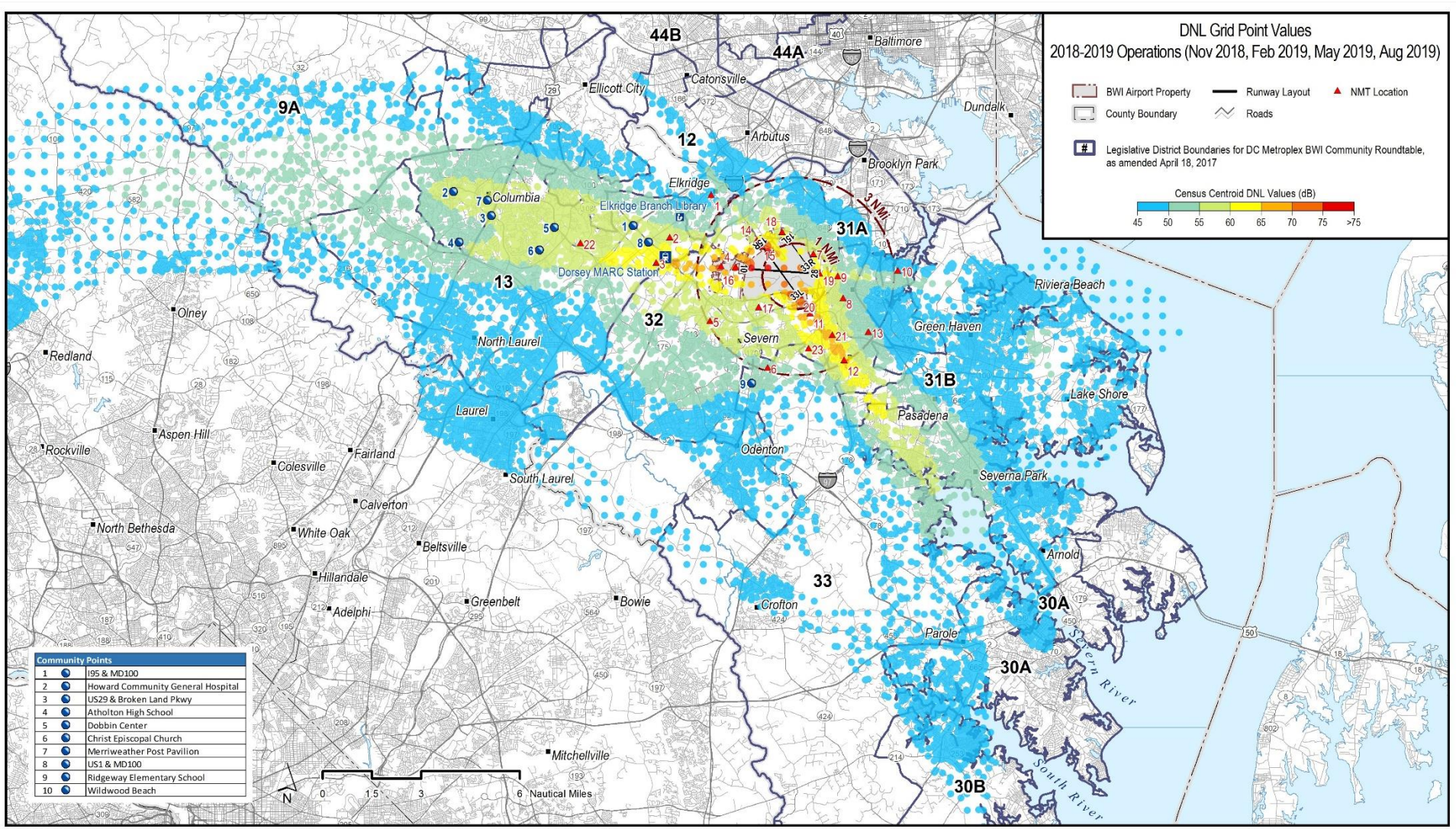
| Contour Range | Population | Households |
|---|---|---|
| **55-60 dB** | 87,615 | 34,138 |
| **60-65 dB** | 19,678 | 8,075 |
| **65-70 dB** | 3,654 | 1,554 |
| **70-75 dB** | 427 | 166 |
| **75+ dB** | 18 | 7 |
| **Total** | **111,392** | **43,940** |



# Modeled DNL Grid Points - 2012

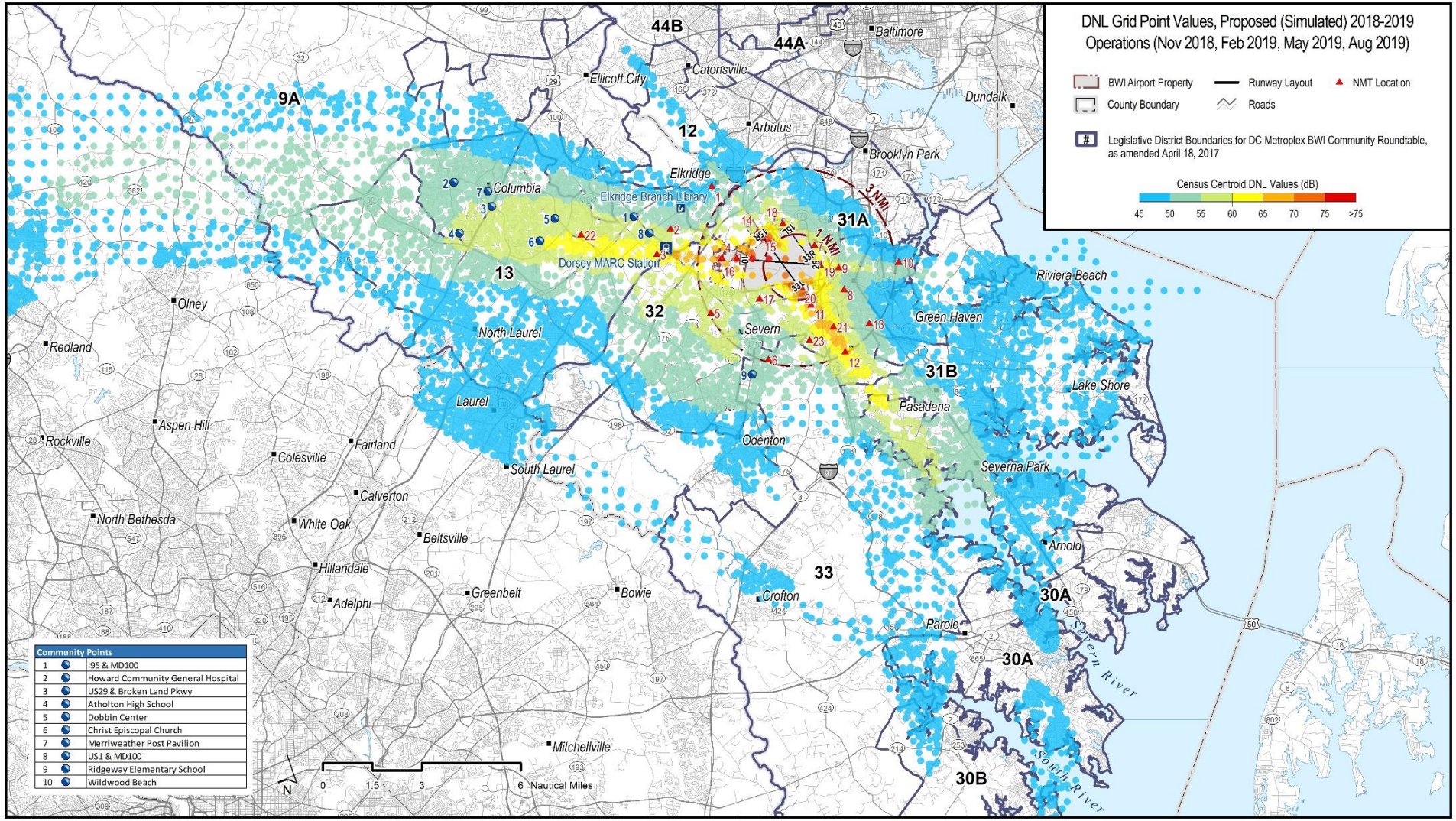


# Modeled DNL Grid Points – 2018-2019




Pre-Decisional: For informational purposes only

# Modeled DNL Grid Points – 2018-2019 Proposed (Simulated)

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